

ABSTRACT OF THE DISCLOSURE

An apparatus and method for making a microscopic paddle wheel coupled inductively by an external electromagnet and used for valving and active pumping so that the actual pumping mechanism is completely isolated from the electromagnetic driver. The paddle wheel is inexpensive to manufacture and disposable. A cartridge having a network of conduits and reservoirs contains several of such paddle wheels to transport blood and reagents. A point-of-care device houses the electromagnetic driving mechanism and is reused with successive cartridges since the paddle wheels are contained by the cartridge and do not contaminate the driving mechanism.